

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C., 20460OFFICE OF
CHEMICAL SAFETY AND
POLLUTION PREVENTIONPC Code: 124002
DP Barcode: D361127

MEMORANDUM

DATE: August 3, 2010

SUBJECT: Review of an Investigation of Buffer Efficacy in Mitigating the Potential Transport of Novaluron in Runoff Using Simulated Rainfall on Small Plots.

TO: John Hebert, Risk Manager
Jennifer Gaines, Risk Manager Reviewer
Registration Division (7505P)FROM: Iwona L. Maher, Chemist, ERBI
Environmental Fate and Effects Division (7507P)THROUGH: Brian Anderson, Acting Branch Chief
Environmental Fate and Effects Division (7507P)

The registrant of novaluron submitted an investigation of buffer efficacy in mitigating the potential transport of novaluron in runoff using simulated rainfall on small plots. The evaluation results are provided below. Please refer to the attached DER for additional details.

Table 1. Environmental fate data requirements for novaluron

MRID	Study Classification ¹	Remarks
47641401	Supplemental/NG	No additional data needed

¹OPPIN Classifications:

Acceptable/Guideline; Acceptable/Non-Guideline; Cited; Confirmatory; Decision Deferred; Extraneous submission; In Review; No Decision; Partially Acceptable; Supplemental: Unacceptable/Guideline; Unacceptable/Non-Guideline; Upgradeable.



2085516

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff.

PMRA Submission Number {.....}

EPA MRID Number 47641401

Data Requirement: PMRA Data Code:
EPA DP Barcode: 361127
OECD Data Point:
EPA Guideline: Non-guideline

Test material: Novaluron

End Use Product name: Rimon® 0.83EC
Formulation type: Emulsifiable concentrate (EC)

Concentration of a.i.: 9.92%

Active ingredient:

Common name: Novaluron.

Chemical name:

IUPAC name: N-[(3-Chloro-4-[1,1,2-trifluoro-2-(trifluoromethoxy)ethoxy]phenyl)amino]carbonyl]-2,6-difluorobenzamide.
(RS)-1-[3-Chloro-4-(1,1,2-trifluoro-2-trifluoromethoxyethoxy)phenyl]-3-(2,6-difluorobenzoyl)urea.

CAS name: Benzamide, N-[[[3-chloro-4-[1,1,2-trifluoro-2-(trifluoromethoxy)ethoxy]phenyl]amino]carbonyl]-2,6-difluoro-
N-[[[3-Chloro-4-[1,1,2-trifluoro-2-(trifluoromethoxy)ethoxy]phenyl]amino]carbonyl]-2,6-difluorobenzamide.

CAS No.: 116714-46-6.

Synonyms Not reported.

Smiles string: C1(C(=O)NC(=O)NC2=CC=C(OC(F)(F)C(F)OC(F)(F)F)C(Cl)=C2)=C(F)C=CC=C1F (Epi Suite 4.0).

Primary Reviewer: Dan Hunt
Cambridge Environmental

Signature: *Dan Hunt*
Date: 1/20/10

Secondary Reviewer: Joan Harlin
Cambridge Environmental

Signature: *Joan Harlin*
Date: 1/20/10

QC/QA Manager: Joan Gaidos
Cambridge Environmental

Signature: *JG*
Date: 1/20/10

Final Reviewer: *Twana L. Maher*
EPA *SPB1*

Signature: *Twana L. Maher*
Date: *2/3/2010*

Company Code
Active Code
Use Site Category
EPA PC Code: 124002

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

CITATION: Nett, M.T. and A.C. Newcombe. 2008. An investigation of buffer efficacy in mitigating the potential transport of novaluron in runoff using simulated rainfall on small plots. Unpublished study performed by Water Quality Consulting, Colorado Springs, Colorado; LFR Inc., Tallahassee, Florida; PTRL West, Inc., Hercules, California and Agvise Laboratories, Northwood, North Dakota; and sponsored and submitted by Makhteshim-Agan of North America, (MANA), Raleigh, North Carolina. MANA Study ID: R-20568. Experiment initiation September 27, 2006 (test application; Table 2, p. 38) and completion September 12, 2008 (Appendix 2, p. 163). Final report issued November 15, 2008.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

EXECUTIVE SUMMARY

Soil runoff of novaluron (N-[(3-chloro-4-[1,1,2-trifluoro-2-(trifluoromethoxy)ethoxy]phenyl}amino)carbonyl]-2,6-difluorobenzamide) under U.S. field conditions was studied in a cotton-cropped plot of sandy clay loam/clay/sandy loam soil (2.5-3% slope) at one site in Mississippi. The experiment was not carried out in accordance with any USEPA Pesticide Assessment Guideline. The study was conducted in compliance with the USEPA FIFRA (40 CFR, Part 160) GLP standard.

The runoff potential of novaluron was studied using two adjacent replicate plots planted to cotton, following two rainfall simulation events, at 2 and 6 days following application of the test substance. Each replicate plot was divided in half lengthwise, and separated by the installation of metal flashing into the soil to create two subplots within each replicate plot. A grass buffer was installed at the bottom of one subplot of each replicate plot into an excavated area (6.1 m wide x 7.6 m long) of 1.5-inch depth so that the top of the sod was flush with the soil surface from the test plot. The lower end of each subplot was excavated to a depth of 0.6 m (2 ft), and runoff water exiting the plot was directed via a custom-made steel gutter to a fiberglass flume.

Novaluron was applied once (September 27, 2006) to each of the two test plots at a nominal rate of 0.364 kg a.i./ha (0.325 lb a.i./A; the maximum label rate) when the cotton was in the "late bloom" stage of growth. The plots did not receive any rainfall during the study period, and were not irrigated outside of the two rainfall simulation events.

Intense simulated rainfall events of 0.87-0.93 in/hr for *ca.* 90-100 minutes were generated at 2 and 6 days after test substance application to simulate a "worst-case" scenario for runoff of applied novaluron. The volume and uniformity of the simulated rainfall were measured for each event using 20 wide-mouthed cups placed randomly within each replicate plot. The data suggest that the simulated rainfall distribution was fairly uniform across the test plots.

During each rainfall simulation event, runoff water was withdrawn from "splash pans" located directly below each flume through Teflon®-lined tubing using electronic samplers. Runoff samples were delivered into a series of 375-mL glass sample bottles (chemograph samples) or into a previously unused stainless-steel 55-gal drum (flow proportional samples), enabling the collection of runoff on both a time-sequenced basis (as three aliquots of *ca.* 90 mL at 3-minute intervals composited into 9-minute samples), and on a unit-flow basis (1 L per 7 ft³ of runoff; collected during the first simulated rainfall event only).

Runoff samples were analyzed for novaluron and the transformation product chlorophenyl urea (CPU) after separating the samples into sediment and water fractions by allowing the samples to settle for at least one hour. Sediment fractions were extracted with methanol:water (1:1, v:v) followed by acetone:hexane (1:1, v:v) by shaking for 15 minutes. Water fractions were partitioned with dichloromethane. The soil and water extracts were combined and analyzed for novaluron and CPU by LC/MS/MS. The LOD for novaluron and CPU was 0.004 µg/L and the LOQ was 0.1 µg/L.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Results indicate that the 6.1 m wide x 7.6 m long Bermuda grass buffer reduced the transport of novaluron by 60.4-68.0% following the first simulation event, and by 47.6% following the second simulation event (no data were available for replicate plot 1, following the second application, due to a malfunction of the sampler). The transport of the transformation product CPU was reduced by 61.1-69.2% following the first simulation event, but was not reduced following the second simulation event (based on replicate plot 2 data, while replicate plot 1 data were not available).

Simulated rainfall event 1

Following the first runoff event, runoff yields from replicate plot 1 totaled 8327 L or 41% of the applied rainfall for the buffered subplot, and 8471 L or 54% for the non-buffered subplot. The total mass of novaluron transported from replicate plot 1, based on time-sequenced sampling, was 465.7 mg and 149.1 mg for the non-buffered and buffered subplots, respectively, representing approximately 4.3% and 1.4% of the test chemical applied. A total of 1.78 mg CPU was detected in the runoff of the non-buffered subplot, and a total of 0.69 mg CPU was detected in the runoff of the buffered subplot. Flow proportional sampling data provided a confirmation for the time-sequenced sampling data, with extrapolated total novaluron recoveries of 400.7 mg for the non-buffered plot and 139.1 mg for the buffered subplot; extrapolated total recoveries of CPU were 1.73 mg for the non-buffered subplot and 0.80 mg for the buffered subplot.

Following the first runoff event, runoff yields from replicate plot 2 totaled 10409 L or 58% of the applied rainfall for the buffered subplot and 6923 L or 51% for the non-buffered subplot. The total mass of novaluron transported from replicate plot 2, based on time-sequenced sampling, was 222.0 mg and 87.9 mg for the non-buffered and buffered subplots, respectively, representing approximately 2.1% and 0.8% of the test chemical applied. A total of 1.30 mg CPU was detected in the runoff of the non-buffered subplot, and a total of 0.44 mg CPU was detected in the runoff of the buffered subplot. Flow proportional sampling data provided a confirmation for the time-sequenced sampling data, with extrapolated total novaluron recoveries of 242.3 mg for the non-buffered subplot and 104.9 mg for the buffered subplot; extrapolated total recoveries of CPU were 1.50 mg for the non-buffered subplot and 1.13 mg for the buffered subplot.

Simulated rainfall event 2

Following the second runoff event, runoff yields from replicate plot 1 totaled 8883 L or 58% of the applied rainfall for the non-buffered subplot; data for the buffered subplot were not available due to a malfunction of the sampler. The total mass of novaluron transported from replicate plot 1, based on time-sequenced sampling, was 137.8 mg for the non-buffered subplot, representing approximately 1.3% of the test chemical applied. A total of 6.8 mg CPU was detected in the runoff of the non-buffered subplot.

Following the second runoff event, runoff yields from replicate plot 2 totaled 12449 L or 76% of the applied rainfall for the buffered subplot and 9160 L or 68% for the non-buffered subplot. The total mass of novaluron transported from replicate plot 2, based on time-sequenced sampling, was 94.7 mg and 49.6 mg for the non-buffered and buffered subplots, respectively, representing

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

approximately 0.9% and 0.5% of the test chemical applied. A total of 6.0 mg CPU was detected in the runoff of the non-buffered subplot. A total of 6.8 mg CPU was detected in the runoff of the buffered subplot.

Total entrained sediment in the runoff (2.28-5.63 kg) constituted <1% of the field runoff for all plots.

Study Acceptability: This study provides supplemental data on buffer efficiency in mitigating the potential transport of novaluron and the transformation product chlorophenyl urea (CPU) in runoff using simulated rainfall on small plots in Mississippi. No significant deviations from good scientific practices were noted. The stability of novaluron and its transformation product CPU in runoff samples was not demonstrated under typical laboratory storage conditions.

I. MATERIALS AND METHODS

GUIDELINE FOLLOWED:

The study was not conducted according to USEPA Pesticide Assessment Guidelines.

COMPLIANCE:

The study was conducted in compliance with USEPA FIFRA (40 CFR, Part 160) Good Laboratory Practice standards (pp. 3, 13). A signed and dated Data Confidentiality claim, GLP, Quality Assurance, and Certificate of Authenticity statements were provided (pp. 2-5).

A. MATERIALS:

1. Test Material

Rimon[®] 0.83EC (novaluron; Lot No.: 50110342; pp. 13, 18).

Chemical Structure of the active ingredient(s):

See DER Attachment 1.

Description:

Novaluron – white needles (Appendix 1, p. 142).

Storage conditions of test chemicals:

Not reported.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Physico-chemical properties of the active ingredient(s):

Parameter	Value	Comment
Chemical formula	$C_{17}H_9ClF_8N_2O_4$	
Molecular mass	492.7 g/mole	
Water Solubility	3 µg/L	At 20°C.
Vapor Pressure/Volatility	1.2×10^{-7} mm Hg	
UV Absorption		
pKa		
log K_{ow}	4.3	
Stability of compound at room temperature, if provided		

Data were obtained from Table 4, p. 40 of the study report.

2. Test site: The test site was located approximately two miles south of Greenville, in Washington County, Mississippi, on approximately four acres of a large field used for commercial crop production (p. 14 and Figure 1, p. 69). Products containing novaluron were not applied within the previous four years. A 4-year plot history was provided in Table 3 (p. 39).

Table 1: Geographic location, site description, and climatic data at the study site.

Details		Test site
Geographic coordinates	Latitude	33.3555°N
	Longitude	91.0587°W
	Province/State	Mississippi
	Country	US
	Ecoregion	Not reported
Slope Gradient		2.5-3%
Depth to ground water (m)		Not reported
Distance from weather station used for climatic measurements		Precipitation was measured on-site (HOBO® tipping rain gauge). Relative humidity, rainfall, soil temperature, air temperature and wind speed and direction were measured approximately two miles southwest of the test site.
Indicate whether the meteorological conditions before starting or during the study were within 30 year normal levels (Yes/No). If no, provide details.		N/A. The study duration was only 6 days.

Data were obtained from pp. 13-14, 17-18 and Table 8, p. 44 of the study report.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Table 2: Site usage and management history for the previous three years.

Use	Year	Test site
Crops grown	2006	Ryegrass followed by cotton
	2005	Soybeans
	2004	Soybeans
	2003	Corn
Pesticides used	2006	Roundup® + Cinch® + Asana® (glyphosate + S-metolachlor + atrazine + esfenvalerate), MSMA, Centric® (thiamethoxam), Touchdown® (glyphosate), and Thionex® (endosulfan).
	2005	Roundup Weathermax® (glyphosate), Valor® (flumioxazin), Quadris® (azoxystrobin), Roundup O-Max® (1/8) (glyphosate), and Classic® (chlorimuron ethyl).
	2004	Roundup Weathermax® (glyphosate), 2,4-D, Roundup O-Max® (glyphosate), and Classic® (chlorimuron ethyl).
	2003	Atrazine and Roundup® (glyphosate).
Fertilizers used	2006	An unspecified fertilizer was applied in July 2006.
	2005	Not reported
	2004	Not reported
	2003	Not reported
Cultivation methods, if provided (eg., Tillage)	2006	Not reported
	2005	Not reported
	2004	Not reported
	2003	Not reported

Data were obtained from pp. 15-16 and Table 3, p. 39 of the study report. Pesticides reported for 2006 are prior to the application of the test substance. The cover crop was reported to be winter wheat (p. 14 of the study report). To prepare the field for the study, the test plots were roto-tilled in May 2006 and the ryegrass was removed (p. 15 of the study report).

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

3. Soils:

Table 3a: Properties of the soil from Plot 1 (buffered).

Property		Depth (cm)								
		0-2.5	2.5-10	10-30	0-2.5	2.5-10	10-30	0-2.5	2.5-10	10-30
Sampling area		Top			Mid-plot			Bottom		
Textural classification ¹		SL	SL	SL	Clay	Clay	CL	SCL	SCL	SCL
% sand		NR	NR	NR	NR	NR	NR	NR	NR	NR
% silt		NR	NR	NR	NR	NR	NR	NR	NR	NR
% clay		NR	NR	NR	NR	NR	NR	NR	NR	NR
pH		6.0	5.2	5.3	6.0	5.6	5.6	6.4	5.9	6.0
Organic matter (%)		1.0	1.0	0.7	2.0	1.6	1.5	2.2	2.0	1.6
Organic carbon (%)		0.6	0.6	0.4	1.2	0.9	0.9	1.3	1.2	0.9
CEC (meq/100 g)		8.9	12.0	13.1	21.2	22.5	23.5	18.5	18.6	19.6
Bulk density (g/cm ³)	Event 1	1.18	1.23	1.30	1.24	1.38	1.29	1.46	1.51	1.43
	Event 2	1.23	1.32	1.36	1.43	1.47	1.49	1.54	1.52	1.51
Moisture at 1/3 atm (%)		20.7	23.5	24.4	29.3	34.9	37.6	29.1	30.0	34.9
Taxonomic classification (e.g., ferro-humic podzol)		Bowdre: Clayey over loamy, smectitic, thermic Fluvaquentic Hapludoll Dowling: Very-fine, smectitic, nonacid, thermic Vertic Endoaquept								
Soil mapping unit		NR	NR	NR	NR	NR	NR	NR	NR	NR

Data were obtained from p. 14 and Tables 8-9, pp. 44-47 of the study report. A visual diagram is provided in Figure 7, p. 75 of the study report. Organic carbon was calculated by the reviewer from percent organic matter (% o.c. = % o.m./1.72). The taxonomic classifications were obtained from the NRCS for the Bowdre and Dowling soil series. The site was reported to be predominantly Bowdre silty clay with areas of Dowling clay (p. 14 and Figure 4, p. 72 of the study report). NR = Not reported.

¹ As reported by the registrant in Table 8, pp. 44-45 of the study report. The reviewer could not confirm the textural classifications because the percent sand, silt, and clay were not reported. SL = Sandy loam. CL = Clay loam. SCL = Sandy clay loam.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Table 3b: Properties of the soil from Plot 2 (buffered).

Property		Depth (cm)								
		0-2.5	2.5-10	10-30	0-2.5	2.5-10	10-30	0-2.5	2.5-10	10-30
Sampling area		Top			Mid-plot			Bottom		
Textural classification ¹		SL	SCL	SL	Clay	SCL	CL	SCL	SCL	SCL
% sand		NR	NR	NR	NR	NR	NR	NR	NR	NR
% silt		NR	NR	NR	NR	NR	NR	NR	NR	NR
% clay		NR	NR	NR	NR	NR	NR	NR	NR	NR
pH		6.3	5.5	5.5	6.3	5.9	5.9	6.7	5.9	5.9
Organic matter (%)		1.2	1.2	0.7	1.9	1.7	1.7	2.1	2.1	1.6
Organic carbon (%)		0.7	0.7	0.4	1.1	1.0	1.0	1.2	1.2	0.9
CEC (meq/100 g)		12.1	14.8	16.1	23.2	22.9	22.1	15.8	17.9	20.8
Bulk density (g/cm ³)	Event 1	1.41	1.39	1.41	1.36	1.37	1.26	1.51	1.47	1.46
	Event 2	1.48	1.48	1.42	1.38	1.42	1.33	1.37	1.38	1.22
Moisture at 1/3 atm (%)		27.3	27.2	29.4	33.4	34.1	34.8	26.8	29.0	33.7
Taxonomic classification (e.g., ferro-humic podzol)		Bowdre: Clayey over loamy, smectitic, thermic Fluvaquentic Hapludoll Dowling: Very-fine, smectitic, nonacid, thermic Vertic Endoaquept								
Soil mapping unit		NR	NR	NR	NR	NR	NR	NR	NR	NR

Data were obtained from p. 14 and Tables 8-9, pp. 44-47 of the study report. A visual diagram is provided in Figure 7, p. 75 of the study report. Organic carbon was calculated by the reviewer from percent organic matter (% o.c. = % o.m./1.72). The taxonomic classifications were obtained from the NRCS for the Bowdre and Dowling soil series. The site was reported to be predominantly Bowdre silty clay with areas of Dowling clay (p. 14 and Figure 4, p. 72 of the study report). NR = Not reported.

¹ As reported by the registrant in Table 8, pp. 44-45 of the study report. The reviewer could not confirm the textural classifications because the percent sand, silt, and clay were not reported. SL = Sandy loam. CL = Clay loam. SCL = Sandy clay loam.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Table 3c: Properties of the soil from Plot 1 (non-buffered).

Property		Depth (cm)								
		0-2.5	2.5-10	10-30	0-2.5	2.5-10	10-30	0-2.5	2.5-10	10-30
Sampling area		Top			Mid-plot			Bottom		
Textural classification ¹		SL	SL	SL	Clay	Clay	CL	SCL	SCL	SCL
% sand		NR	NR	NR	NR	NR	NR	NR	NR	NR
% silt		NR	NR	NR	NR	NR	NR	NR	NR	NR
% clay		NR	NR	NR	NR	NR	NR	NR	NR	NR
pH		6.3	5.4	5.4	6.0	5.6	5.6	6.6	5.8	6.0
Organic matter (%)		1.5	1.1	0.5	2.0	1.6	1.5	2.3	2.0	1.6
Organic carbon (%)		0.9	0.6	0.3	1.2	0.9	0.9	1.3	1.2	0.9
CEC (meq/100 g)		9.9	11.4	12.7	21.2	22.5	23.5	16.7	18.0	19.9
Bulk density (g/cm ³)	Event 1	1.35	1.38	1.36	1.24	1.38	1.29	1.57	1.54	1.53
	Event 2	1.27	1.35	1.32	1.43	1.47	1.49	1.52	1.50	1.47
Moisture at 1/3 atm (%)		22.5	23.6	24.2	29.3	34.9	37.6	28.3	29.3	34.6
Taxonomic classification (e.g., ferro-humic podzol)		Bowdre: Clayey over loamy, smectitic, thermic Fluvaquentic Hapludoll Dowling: Very-fine, smectitic, nonacid, thermic Vertic Endoaquept								
Soil mapping unit		NR	NR	NR	NR	NR	NR	NR	NR	NR

Data were obtained from p. 14 and Tables 8-9, pp. 44-47 of the study report. A visual diagram is provided in Figure 7, p. 75 of the study report. Organic carbon was calculated by the reviewer from percent organic matter (% o.c. = % o.m./1.72). The taxonomic classifications were obtained from the NRCS for the Bowdre and Dowling soil series. The site was reported to be predominantly Bowdre silty clay with areas of Dowling clay (p. 14 and Figure 4, p. 72 of the study report). NR = Not reported.

¹ As reported by the registrant in Table 8, pp. 44-45 of the study report. The reviewer could not confirm the textural classifications because the percent sand, silt, and clay were not reported. SL = Sandy loam. CL = Clay loam. SCL = Sandy clay loam.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Table 3d: Properties of the soil from Plot 2 (non-buffered).

Property		Depth (cm)								
		0-2.5	2.5-10	10-30	0-2.5	2.5-10	10-30	0-2.5	2.5-10	10-30
Sampling area		Top			Mid-plot			Bottom		
Textural classification ¹		SCL	SL	SL	Clay	SCL	CL	SCL	SCL	SCL
% sand		NR	NR	NR	NR	NR	NR	NR	NR	NR
% silt		NR	NR	NR	NR	NR	NR	NR	NR	NR
% clay		NR	NR	NR	NR	NR	NR	NR	NR	NR
pH		7.2	5.9	5.8	6.3	5.9	5.9	6.5	5.9	6.0
Organic matter (%)		1.2	1.1	0.7	1.9	1.7	1.7	2.2	1.9	1.4
Organic carbon (%)		0.7	0.6	0.4	1.1	1.0	1.0	1.3	1.1	0.8
CEC (meq/100 g)		12.0	14.1	14.0	23.2	22.9	22.1	16.6	17.6	20.6
Bulk density (g/cm ³)	Event 1	1.28	1.36	1.34	1.36	1.37	1.26	1.43	1.43	1.40
	Event 2	1.23	1.46	1.39	1.38	1.42	1.33	1.26	1.33	1.28
Moisture at 1/3 atm (%)		23.4	19.2	19.9	33.4	34.1	34.8	26.6	29.7	34.7
Taxonomic classification (e.g., ferro-humic podzol)		Bowdre: Clayey over loamy, smectitic, thermic Fluvaquentic Hapludoll Dowling: Very-fine, smectitic, nonacid, thermic Vertic Endoaquept								
Soil mapping unit		NR	NR	NR	NR	NR	NR	NR	NR	NR

Data were obtained from p. 14 and Tables 8-9, pp. 44-47 of the study report. A visual diagram is provided in Figure 7, p. 75 of the study report. Organic carbon was calculated by the reviewer from percent organic matter (% o.c. = % o.m./1.72). The taxonomic classifications were obtained from the NRCS for the Bowdre and Dowling soil series. The site was reported to be predominantly Bowdre silty clay with areas of Dowling clay (p. 14 and Figure 4, p. 72 of the study report). NR = Not reported.

1 As reported by the registrant in Table 8, pp. 44-45 of the study report. The reviewer could not confirm the textural classifications because the percent sand, silt, and clay were not reported. SL = Sandy loam. CL = Clay loam. SCL = Sandy clay loam.

B. EXPERIMENTAL DESIGN:

1. Experimental design:

The runoff potential of novaluron was studied using two adjacent replicate plots (12.2 x 48.7 m) planted to cotton, following two rainfall simulation events (pp. 14-17). Each replicate plot was divided in half lengthwise, and separated by the installation of metal flashing into the soil to a depth of 7.6-10 cm to create two subplots (Figure 2, p. 70 and Figure 5, p. 73). A grass buffer (6.1 m wide x 7.6 m long) was installed at the bottom of one subplot of each replicate plot in April 2006 to create one buffered subplot and one non-buffered subplot. The sod was placed into an excavated and graded area of 1.5-inch depth so that the top of the sod was flush with the soil surface from the test plot. The lower end of each subplot was excavated to a depth of 0.6 m (2 ft), and runoff water exiting the plot was directed via a custom-made steel gutter to a fibreglass flume (p. 16).

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Novaluron was applied once (September 27, 2006) to each of the two test plots at a nominal rate of 0.364 kg a.i./ha (0.325 lb a.i./A; the maximum label rate) when the cotton was in the "late bloom" stage of growth (prior to boll opening; pp. 19-20). The crop height ranged from 91 to 124 cm (36 to 49 inches), and the canopy coverage was estimated at 80%. The grass buffers and the runoff collection gutters, flumes, and sampling equipment were covered with thick polyethylene sheeting during the test substance application to protect them from accidental contamination during test application.

Intense simulated rainfall events were generated at 2 and 6 days after test substance application to simulate a "worst-case" scenario for runoff of applied novaluron (p. 20). Generated rainfall events occurred at a target rate of 1 inch per hour for a minimum of 90 minutes or until runoff had been generated (0.87-0.93 in/hr for 91-101 minutes; Table 11, p. 48). The intensity and duration of the simulated rainfall events were selected to match natural patterns of significant rainfall in the Mississippi test area. The generated rainfall was delivered to the treated replicate plots, including the buffer, using PVC irrigation risers uniformly positioned in a staggered array approximately every 3.6 m (12 ft) along both sides of the replicate plot (p. 17). The risers extended to a height of 3.0 m (10 ft) above the soil and used 15-psi pressure regulators. The risers were fitted with Nelson S3000 part circle (190°) heads, and each head was fitted with a R3000 U-4 + 8° rotor plate and a #25, 3TN nozzle to deliver a controlled simulated rain. The irrigation water was obtained from an on-site irrigation well. The replicate plots were not irrigated simultaneously, but in sequence, with both plots receiving rainfall on the same day.

The volume and uniformity of the simulated rainfall were measured for each event using 20 wide-mouthed cups (4.5-inch diameter) placed randomly within each replicate plot (including buffer; p. 17). The cups were secured so that the cup opening was above the cotton crop and field surface to eliminate the inclusion of splashed material. Mean collection volumes ranged from 419 to 513 mL for the four collection events (CV values ranged from 18% to 36%), suggesting that simulated rainfall distribution was fairly uniform across the test plots (p. 28; Table 12, p. 49).

Table 4: Experimental design.

Details		Test site	
Duration of study		6 days	
Uncropped (bare) or cropped		Cropped	
Control used (Yes/No)		No	
No. of replications	Controls	N/A	
	Treatments	Two	
Plot size (L x W m)	Controls	N/A	
	Treatments	12.2 x 48.7 m, divided into two 6.1 x 48.7 m subplots (one buffered with grass at the bottom of the plot and one non-buffered)	
Distance between control plot and treated plot		N/A	
Distance between treated plots		6.1 m	
Application rate(s) used (g a.i./ha)		364 g a.i./ha (147 g a.i./A)	

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Details		Test site
Was the maximum label rate per ha used in study? (Yes/No)		Yes
Number of applications		One
Application Date(s) (dd mm yyyy)		27/09/2006
Concentration expected in the 0-15 cm soil zone, based on the target first application rate and soil density (mg a.i./kg soil)		N/A
Application method (eg., spraying, broadcast etc.)		Spraying
Type of spray equipment, if used		3 gal backpack spray tank with handheld boom equipped with four Teejet flatfan 110015 nozzles.
Total volume of spray solution applied/plot OR total amount broadcasted/plot		10.2 gal/A
Identification and volume of carrier (e.g., water), if used		Water, 10.433 L
Name and concentration of co-solvents, adjuvants and/or surfactants, if used		None
Indicate whether the following monthly reports were submitted:		
Precipitation:		Yes
Average minimum and maximum air temperature:		No
Average minimum and maximum soil temperature:		No
Average annual frost-free periods:		No
Indicate whether the Pan evaporation data were submitted		No
Meteoro-logical conditions during application	Cloud cover	10%
	Temperature (°C)	17.8
	Humidity	71%
	Wind speed and direction	0-3.7 mph / SW
	Sunlight (hr)	Not reported
Pesticides used during study:		None reported
Name of product/a.i conc.: Amount applied: Application method:		
Supplemental irrigation used (Yes/No) ¹ If yes, provide the following details: No. of irrigation: Interval between irrigation: Amount of water added each time: Method of irrigation:		The plots were not irrigated outside of the two rainfall simulation events.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Details	Test site
Indicate whether water received through rainfall + irrigation equals the 30 year average rainfall (Yes/No)	N/A. The study duration was only 6 days.
Were the application concentrations verified?	No
Were field spikes used?	No
Good agricultural practices followed (Yes or No)	Not reported
Indicate if any abnormal climatic events occurred during the study (eg., drought, heavy rainfall, flooding, storm etc.)	No natural rainfall occurred during the study between the application of the test substance and the completion of the second simulated rainfall event.
If cropped plots are used, provide the following details:	
Plant - Common name/variety:	Dryland cotton/var. DPL 117
Details of planting:	Planted on the contour on June 13, 2006 using a 36-inch row spacing, and with a knife injection of nitrogen fertilizer (100 lb/A).
Crop maintenance:	Irrigated (sprinkler) as needed from July through September 2006.
Volatilization included in the study (Yes/No)	No
Leaching included in the study (Yes/No)	No
Run off included in the study (Yes/No)	Yes

Data were obtained from pp. 13-20, 26; Table 2, p. 38; Table 5, p. 41; Figure 5, p. 73 and Appendix 6, pp. 312-316 of the study report. The test substance, Rimon® 0.83EC, was applied as a tank mixture with Thionex® 3EC (436 mL of Rimon® 0.83EC + 556 mL Thionex® 3EC mixed with 10.43 L of water).

2. Application Verification: The application rate was not verified using application monitoring devices, but calibration data were provided (see Reviewer's Comments).

3. Field Spiking: Field spikes were not prepared to determine the stability of the parent and transformation products during transport and storage of the test samples.

4. Volatilization: Volatilization was not measured.

5. Leaching: Leaching was not determined.

6. Run off: To collect runoff water, the lower end of each subplot was excavated to a depth of 0.6 m (2 ft) to allow for the runoff collection assembly (p. 16 and Figure 6, p. 74). Runoff water exiting the plot was routed along a custom-made steel gutter (4-inch x 4-inch x 20-foot) to a fiberglass 60° trapezoidal flume positioned in a bottom corner of each subplot. Runoff water was withdrawn from "splash pans" located directly below each flume through Teflon®-lined tubing (3/8-inch i.d.) using Isco® Model 6712 samplers. Runoff samples were delivered into either a series of 375-mL glass sample bottles (chemograph samples) or into a previously unused stainless-steel 55-gal drum (flow proportional samples), enabling the collection of runoff on both a time-sequenced basis (as three aliquots of ca. 90 mL at 3-minute intervals) and on a unit-flow basis (1 L per 7 ft³ of runoff; collected during the first simulated rainfall event only).

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Additionally, TSS (total suspended solids) “grab” samples were manually collected directly from the flume outflow into 1-L glass jars at 9-minute intervals for the determination of total suspended solids in the runoff samples (p. 21).

7. Supplementary Study: A laboratory storage stability study was not conducted for novaluron.

8. Sampling: Runoff water samples were collected during simulated rainfall events at 2 and 6 days posttreatment (pp. 22-23).

Table 5: Sampling of runoff water

Details	Plots 1 and 2
Rainfall/irrigation events	2 and 6 days posttreatment
Type of samples collected	Time-sequenced (chemograph) samples were collected at both rainfall events, and additional flow proportional samples were collected during the first simulated rainfall event.
Method of collection and volume of water collected per plot	<p>Time sequenced samples: Three aliquots of <i>ca.</i> 90 mL were collected from each of the four subplots from the “splash pan” attached directly below the flume mouth, at 3-minute intervals, using Isco® Model 6712 electronic pump samplers. The number of samples collected was determined by the duration of the runoff event (11 samples per subplot, per sampling event).</p> <p>Flow proportional samples: Runoff water was collected into 55-gal steel drums at a rate of 1 L per 7 ft³ of flow using a second Isco® Model 6712 electronic pump sampler.</p>
Method of sample processing, if any	<p>Time-sequenced samples: Three consecutive aliquots were combined to provide a single 9-minute sample. Following collection, samples were immediately capped, sealed, and placed on wet ice until placed into freezer storage.</p> <p>Flow proportional samples: The steel drums were sealed and stored at <i>ca.</i> 10°C for 24-48 hours prior to mixing thoroughly with a bladed dry wall mixer to mix the water and sediment. Following mixing, triplicate <i>ca.</i> 500-mL samples were withdrawn into 1-L glass bottles, capped, sealed, and stored frozen until analysis.</p>
Storage conditions	Freezer
Storage length	Up to 371 days

Data were obtained from pp. 22-25 and Appendix 2, Table I, p. 184 of the study report.

9. Analytical Procedures: Runoff samples were analyzed for novaluron and the transformation product chlorophenyl urea (CPU; 1-[3-chloro-4-(1,1,2-trifluoro-2-trifluoromethoxyethoxy)phenyl] urea; pp. 18, 25; Appendix 1, p. 143).

Extraction, clean up and concentration of runoff water samples: Runoff samples were separated into sediment and water fractions by allowing the samples to settle for at least one hour (p. 25; Appendix 1, p. 102). Sediment fractions were extracted twice with 20 mL of methanol:water (1:1, v:v) and then twice with acetone:hexane (1:1, v:v) by shaking for 15 minutes, and water fractions were combined with 20 g of sodium chloride and partitioned twice with 100 mL of dichloromethane

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

(Appendix 1, p. 103). The soil and water extracts were combined, partitioned twice with dichloromethane, evaporated to dryness, and reconstituted in acetonitrile (Appendix 1, p. 104).

Identification and quantification of parent compound and transformation products: Extracts were analyzed for novaluron and CPU by HPLC (Michrom Bioresources Inc. Magic C18 column, 15 cm x 2.0 mm i.d., 5µm particle size) using a mobile phase gradient of 0.05% formic acid in HPLC grade water:0.05% formic acid in HPLC grade methanol (90:10 to 0:100 to 90:10, v:v) with MS/MS detection (electrospray in negative ionization mode; p. 25; Appendix 1, pp. 105-107). Analytes were identified by comparison of their retention times with the calibration standards. The approximate retention times were 16-17 minutes for novaluron and 14-15 minutes for CPU. Concentrations were determined using calibration curves.

Reference standards.

Compound	Batch No.	PTRL No.	Purity	Expiration date
Novaluron	AC-1865-CMP-117	1632W-010	99.84%	April 30, 2010
CPU	EPP/DT 491.14	1632W-011	>99%	July 12, 2008

Data were obtained from Appendix 1, p. 98 of the study report.

Detection limits (LOD, LOQ) for the parent compound and transformation products in runoff water: The LOD for novaluron and CPU was 0.004 µg/L, and the LOQ was 0.1 µg/L, which is the lowest validated fortification level (p. 25; Appendix 1, p. 110).

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

II. RESULTS AND DISCUSSION

Results indicate that the 6.1 m wide x 7.6 m long (20 ft wide x 25 ft long) Bermuda grass buffer reduced the transport of novaluron by 60.4-68.0% following the first simulation event, and by 47.6% following the second simulation event (no data were available for replicate plot 1 following the second application due to a malfunction of the sampler; Table I, p. 12). The transport of the transformation product CPU was reduced by 61.1-69.2% following the first simulation event, but was not reduced following the second simulation event.

Simulated rainfall event 1

Following the first runoff event, runoff yields from replicate plot 1 totaled 8327 L or 41% of the applied rainfall for the buffered subplot and 8471 L or 54% for the non-buffered subplot (Table 11, p. 48). The total mass of novaluron transported from replicate plot 1, based on time-sequenced (chemograph) sampling, was 465.7 mg and 149.1 mg for the non-buffered and buffered subplots, respectively, representing approximately 4.3% and 1.4% of the test chemical, based on a total of 10.75 g a.i. applied to each subplot applied (p. 30; Table 6, p. 42; Tables 13-14, pp. 50-51; and Figures 8-9, p. 76). A total of 1.78 mg CPU was detected in the runoff of the non-buffered subplot and a total of 0.69 mg CPU was detected in the runoff of the buffered subplot. A graphical representation of the runoff yield is provided in Figures 15-16 (p. 80). Flow proportional sampling data provided a confirmation for the time-sequenced sampling data, with extrapolated total novaluron recoveries of 400.7 mg for the non-buffered subplot and 139.1 mg for the buffered subplot; extrapolated total recoveries of CPU were 1.73 mg for the non-buffered subplot and 0.80 mg for the buffered subplot (Table 29, p. 66).

Recovery of novaluron and CPU from **replicate plot 1** following the first rainfall simulation event, measured on a time-sequenced basis (chemograph sampling).

Sampling interval	Non-buffered			Buffered		
	Integral flow (L)	Novaluron (mg)	CPU (mg)	Integral flow (L)	Novaluron (mg)	CPU (mg)
9	223	15.7	0.041	102	1.2	0.003
18	553	52.3	0.245	371	9.0	0.029
27	666	63.4	0.301	655	20.1	0.080
36	776	62.9	0.207	818	14.6	0.105
45	844	59.7	0.204	889	19.1	0.086
54	863	48.1	0.129	969	20.2	0.077
63	878	43.7	0.132	1007	16.6	0.087
72	871	31.9	0.172	1048	17.0	0.076
81	908	30.2	0.117	1060	15.3	0.062
90	935	30.3	0.123	1052	12.2	0.067
99	954	27.7	0.111	356	3.8	0.021
Total	8471	465.7	1.78	8327	149.1	0.69

Data were obtained from Tables 13-14, pp. 50-51 of the study report.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Following the first runoff event, runoff yields from replicate plot 2 totaled 10409 L or 58% of the applied rainfall for the buffered subplot and 6923 L or 51% for the non-buffered subplot (Table 11, p. 48). The total mass of novaluron transported from replicate plot 2, based on time-sequenced (chemograph) sampling, was 222.0 mg and 87.9 mg for the non-buffered and buffered subplots, respectively, representing approximately 2.1% and 0.8% of the test chemical, based on a total of 10.75 g a.i. applied to each subplot (p. 30; Table 6, p. 42; Tables 15-16, pp. 52-53; and Figures 10-11, p. 77). A total of 1.30 mg CPU was detected in the runoff of the non-buffered subplot and a total of 0.44 mg CPU was detected in the runoff of the buffered subplot. A graphical representation of the runoff yield is provided in Figures 17-18 (p. 81). Flow proportional sampling data provided a confirmation for the time-sequenced sampling data, with extrapolated total novaluron recoveries of 242.3 mg for the non-buffered subplot and 104.9 mg for the buffered subplot; extrapolated total recoveries of CPU were 1.50 mg for the non-buffered subplot and 1.13 mg for the buffered subplot (Table 29, p. 66).

Recovery of novaluron and CPU from **replicate plot 2** following the first rainfall simulation event, measured on a time-sequenced basis (chemograph sampling).

Sampling interval	Non-buffered			Buffered		
	Integral flow (L)	Novaluron (mg)	CPU (mg)	Integral flow (L)	Novaluron (mg)	CPU (mg)
9	42	0.00096	0.000	227	0.007	0.000
18	201	5.36	0.027	776	0.05	0.002
27	515	30.0	0.178	908	9.0	0.046
36	696	33.3	0.184	1067	12.4	0.056
45	765	31.6	0.170	1124	12.6	0.063
54	818	25.0	0.166	1173	13.0	0.054
63	852	25.8	0.179	1139	11.3	0.052
72	893	21.7	0.130	1196	11.3	0.067
81	908	23.2	0.117	1234	9.0	0.048
90	916	19.7	0.114	1283	7.8	0.042
99	318	6.39	0.040	280	1.5	0.008
Total	6923	222.0	1.30	10409	87.9	0.44

Data were obtained from Tables 15-16, pp. 52-53 of the study report.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Simulated rainfall event 2

Following the second runoff event, runoff yields from replicate plot 1 totaled 8883 L or 58% of the applied rainfall for the non-buffered subplot; data for the buffered subplot was not available due to a malfunction of the sampler (Table 11, p. 48). The total mass of novaluron transported from replicate plot 1, based on time-sequenced (chemograph) sampling, was 137.8 mg for the non-buffered subplot, representing approximately 1.3% of the test chemical applied, based on a total of 10.55 g a.i. applied to each subplot (p. 30; Table 6, p. 42; Tables 17-18, pp. 54-55; and Figure 12, p. 78). No flow data were collected for the buffered subplot due to a malfunction of the sampler. A total of 6.8 mg CPU was detected in the runoff of the non-buffered subplot. A graphical representation of the runoff yield is provided in Figure 19 (p. 82).

Recovery of novaluron and CPU from **replicate plot 1** following the second rainfall simulation event, measured on a time-sequenced basis (chemograph sampling).

Sampling interval	Non-buffered			Buffered		
	Integral flow (L)	Novaluron (mg)	CPU (mg)	Integral flow (L)	Novaluron (mg)	CPU (mg)
9	238	3.3	0.25	NA	NA	NA
18	564	11.8	0.57	NA	NA	NA
27	746	18.8	0.88	NA	NA	NA
36	844	16.0	0.76	NA	NA	NA
45	889	15.4	0.71	NA	NA	NA
54	908	13.7	0.69	NA	NA	NA
63	946	13.2	0.67	NA	NA	NA
72	912	12.2	0.61	NA	NA	NA
81	950	9.9	0.46	NA	NA	NA
90	992	11.5	0.54	NA	NA	NA
99	893	12.0	0.61	NA	NA	NA
Total	8883	137.8	6.8			

Data were obtained from Tables 17-18, pp. 54-55 of the study report. NA = Not available. No flow data were collected due to a malfunction of the Isco® automated sampler.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Following the second runoff event, runoff yields from replicate plot 2 totaled 12449 L or 76% of the applied rainfall for the buffered subplot and 9160 L or 68% for the non-buffered subplot (Table 11, p. 48). The total mass of novaluron transported from replicate plot 2, based on time-sequenced (chemograph) sampling, was 94.7 mg and 49.6 mg for the non-buffered and buffered subplots, respectively, representing approximately 0.9% and 0.5% of the test chemical applied, based on a total of 10.55 g a.i. applied to each subplot (p. 31; Table 6, p. 42; Tables 19-20, pp. 56-57; and Figures 13-14, p. 79). A total of 6.0 mg CPU was detected in the runoff of the non-buffered subplot and a total of 6.8 mg CPU was detected in the runoff of the buffered subplot. A graphical representation of the runoff yield is provided in Figures 20-21 (p. 83).

Recovery of novaluron and CPU from **replicate plot 2** following the second rainfall simulation event, measured on a time-sequenced basis (chemograph sampling).

Sampling interval	Non-buffered			Buffered		
	Integral flow (L)	Novaluron (mg)	CPU (mg)	Integral flow (L)	Novaluron (mg)	CPU (mg)
9	360	5.0	0.22	488	1.51	0.41
18	757	13.5	0.81	1090	6.3	0.80
27	863	10.7	0.65	1207	6.3	0.69
36	905	11.4	0.70	1245	4.0	0.68
45	939	11.0	0.58	1264	5.2	0.65
54	977	8.7	0.62	1298	3.5	0.64
63	992	8.0	0.59	1310	4.3	0.61
72	992	8.4	0.54	1283	3.6	0.56
81	965	7.5	0.53	1283	4.6	0.57
90	916	6.3	0.50	1279	5.9	0.59
99	496	4.3	0.25	700	4.4*	0.61*
Total	9160	94.7	6.0	12449	49.6	6.8

Data were obtained from Tables 19-20, pp. 56-57 of the study report.

* Registrant-calculated, as an estimate, based on the mean of the preceding seven sample concentrations determined at equilibrated flow. The value was incorrectly reported as 6.1 mg in Table 20, p. 57 of the study report.

Total entrained sediment in the runoff (2.28-5.63 kg) constituted <1% of the field runoff for all plots, which is consistent for percent sediment transport from a watershed of similar topographic and hydrologic characteristics (pp. 29-30; Table 11, p. 48 and Tables 21-28, pp. 58-65). Total suspended solids in the TSS "grab" samples (collected at 9-minute intervals) ranged from 230 to 960 mg/L for all replicate plots following the first simulated rainfall event, and from 250 to 960 mg/L for all replicate plots following the second simulated rainfall event.

Mean soil moisture contents of 15.8% (range of 9.3-20.6%) and 19.5% (range of 11.1-24.6%) were determined for replicate plot 1 and 2, respectively, prior to simulated rainfall event 1, and mean soil moisture contents of 17.9% (range of 10.6-21.5%) and 19.9% (range of 12.7-25.0%) were determined for replicate plot 1 and 2, respectively, prior to simulated rainfall event 2, indicating that there was some residual moisture in the soil profile following the first simulated event at the time of the second simulated rainfall event (p. 27 and Tables 9-10, pp. 46-47). Soil moisture was higher at the bottom of the test plots. The soil was moderately dry (*ca.* 65-74% of field capacity) at the time of the simulated rainfall events.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

III. STUDY DEFICIENCIES: The study was conducted to provide quantitative information on the potential of a vegetative buffer to mitigate the transport of novaluron, and was not conducted according to any USEPA Pesticide Assessment Guidelines. The following significant deviation from good scientific practices was noted:

1. The stability of novaluron and its transformation product CPU in runoff samples was not demonstrated under typical laboratory storage conditions. A freezer storage stability study should be conducted using test site samples stored for a period of time that is at least as long as the maximum storage interval of the test samples, 371 days, to determine the stability of the samples under typical laboratory storage conditions.

IV. REVIEWER'S COMMENTS:

1. The application rate was not verified using application monitoring devices such as saturation pads or pans containing control soil, and day 0 soil samples were not collected. As a result, only calibration data were available to support that the target application rate was achieved. Calibration data indicated that the actual application rates were 97.5% and 95.7% of the target rate for replicate plots 1 and 2, respectively (p. 28 and Table 6, p. 42).
2. In a method validation study conducted at PTRL West using water and soil from the test site, mean recovery (\pm RSD) of novaluron and CPU from samples (0.1% or 1.1% soil) fortified at 0.1, 0.5, 1.0, 10, 40, and 150 $\mu\text{g/L}$ were $85 \pm 12\%$ for novaluron and $96 \pm 8.4\%$ for CPU (Appendix 1, pp. 100-101, 111; Table I, p. 115 and Table II, p. 116).
3. At least two concurrent recovery samples were analyzed with each runoff sample set by fortifying samples (containing 0.1% or 1.1% soil) with novaluron and CPU at 0.1, 0.5, 40, and 150 $\mu\text{g/L}$ (Appendix 2, p. 179). Overall average recovery (\pm RSD) was $79 \pm 17\%$ for novaluron and $92 \pm 13\%$ for CPU (Appendix 2, Table II, p. 185).
4. The decline in the mass of novaluron residues observed from the first to second simulated rainfall events (both buffered and non-buffered subplots) was consistent with the behavior indicated by its physicochemical properties (low aqueous solubility, moderate K_{oc}) and the decline in the mass of available parent residue for transport (due to runoff from event 1, field dissipation/degradation and the hydrologic effects of the first rainfall event; p. 31). The increase in levels of the transformation product CPU in the runoff of the second simulated rainfall event was attributed to its enhanced availability and its greater water solubility.
5. The study authors stated that increased runoff yields for the second rainfall event were likely due to the increased antecedent moisture following the first event, the relatively brief drying interval between the first and second events, the presence of established rills that had formed during the first simulated rainfall event, and the visible sealing of the soil surface following the initial event (p. 29). Additionally, the extended dry conditions observed in the months prior to the test substance application served to increase water infiltration and delay the time to runoff for the first simulated rainfall event.

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

6. Prior to test substance application, water (*ca.* 20 gallons) was collected from the irrigation source of the simulated rainfall event, and surface soil samples were collected around the perimeter of each test plot for use in method development and as control samples (p. 22).
7. The Bermuda grass buffers were treated with maintenance chemicals and were mowed during the conduct of the study to ensure maximum biomass at the time of runoff generation (p. 15).
8. A photographic record of field activities is provided in Appendix 4 of the study report (pp. 270-300).

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Attachment 1: Structures of Parent Compound and Transformation Product

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Novaluron [Rimon 0.83EC]

IUPAC Name: N-[(3-chloro-4-[1,1,2-trifluoro-2-(trifluoromethoxy)ethoxy]phenyl)amino]carbonyl]-2,6-difluorobenzamide.
(RS)-1-[3-chloro-4-(1,1,2-trifluoro-2-trifluoromethoxyethoxy)phenyl]-3-(2,6-difluorobenzoyl)urea.

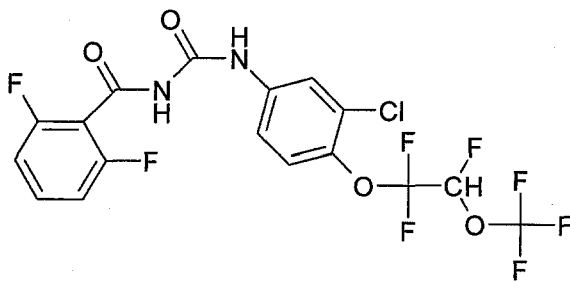
CAS Name: Benzamide, N-[[[3-chloro-4-[1,1,2-trifluoro-2-(trifluoromethoxy)ethoxy]phenyl]amino]carbonyl]-2,6-difluoro-.
N-[[[3-chloro-4-[1,1,2-trifluoro-2-(trifluoromethoxy)ethoxy]phenyl]amino]carbonyl]-2,6-difluorobenzamide.

CAS Number: 116714-46-6.

SMILES String: C1(C(=O)NC(=O)NC2=CC=C(OC(F)(F)C(F)OC(F)(F)F)C(Cl)=C2)=C(F)C=CC=C1F (Epi Suite 4.0).

Empirical formula: C₁₇H₉ClF₈N₂O₄

Molecular formula: C₁₇H₉ClF₈N₂O₄



Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

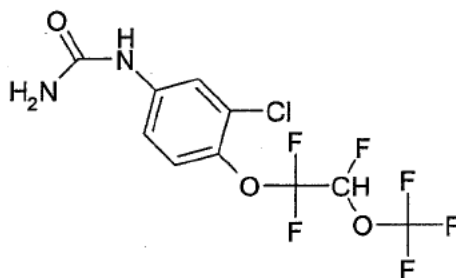
EPA MRID Number 47641401

Chlorophenyl Urea [Novaluron-CPU, CPU]

IUPAC Name: 1-[3-Chloro-4-(1,1,2-trifluoro-2-trifluoromethoxyethoxy)phenyl]urea.

CAS Name: Not reported.

CAS Number: Not reported.



Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Identified Compounds

Data Evaluation Record on buffer efficacy in mitigating the potential transport of novaluron in runoff

PMRA Submission Number {.....}

EPA MRID Number 47641401

Novaluron [Rimon 0.83EC]

IUPAC Name: N-[(3-chloro-4-[1,1,2-trifluoro-2-(trifluoromethoxy)ethoxy]phenyl)amino]carbonyl]-2,6-difluorobenzamide.
(RS)-1-[3-chloro-4-(1,1,2-trifluoro-2-trifluoromethoxyethoxy)phenyl]-3-(2,6-difluorobenzoyl)urea.

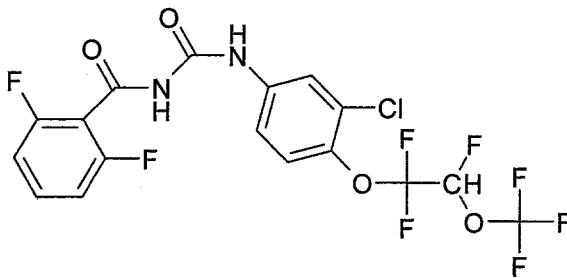
CAS Name: Benzamide, N-[[[3-chloro-4-[1,1,2-trifluoro-2-(trifluoromethoxy)ethoxy]phenyl]amino]carbonyl]-2,6-difluoro-.
N-[[[3-chloro-4-[1,1,2-trifluoro-2-(trifluoromethoxy)ethoxy]phenyl]amino]carbonyl]-2,6-difluorobenzamide.

CAS Number: 116714-46-6.

SMILES String: C1(C(=O)NC(=O)NC2=CC=C(OC(F)(F)C(F)OC(F)(F)F)C(Cl)=C2)=C(F)C=CC=C1F (Epi Suite 4.0).

Empirical formula: C₁₇H₉ClF₈N₂O₄

Molecular formula: C₁₇H₉ClF₈N₂O₄



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EPA MRID Number 47641401

Chlorophenyl Urea [Novaluron-CPU, CPU]

IUPAC Name: 1-[3-Chloro-4-(1,1,2-trifluoro-2-trifluoromethoxyethoxy)phenyl]urea.

CAS Name: Not reported.

CAS Number: Not reported.

